mortality from lung cancer. On p. 40, when it is a question of a correlation between smoking and lung cancer, Eysenck (quoting Thurstone) describes a correlation coefficient as a confession of ignorance. On p. 80, when referring to his questionnaires, he declares approvingly that the similarity between two traits is assessed by "a mathematical technique known as correlation". Moreover, while he insists that correlation is no evidence of causality when dealing with 'smoking' he has no hesitation in interpreting correlation as causality when incriminating 'smoke'. For in Chapter 7 he seems to abandon extraversion and brings forward a "logical indictment of smoke". But he soon leaves smoke and comes down in favour of insufficient enzymatic fermentation in the processing of cigarettes as the cause of lung cancer.

As for breaking the habit of smoking, the method to use is "quite obviously to have punishing consequences follow the smoking of a cigarette *before* the rewarding consequences have any chance to establish themselves". This can be achieved by the aid of an apparatus called a ventilator heater which blows hot air at the smoker "while he pronounces the auto-suggestive phrase 'I want to give up smoking' ". Eysenck concludes: "There is no reason why society should be allowed to poison our lungs, but every reason why we should be allowed to poison our own if we want to". JOHN COHEN

STIELTJES'S MOMENT PROBLEM

The Classical Moment Problem

And some Related Questions in Analysis. By N. I. Akhiezer. Translated by N. Kemmer. (University Mathematical Monographs.) Pp. x+253. (Edinburgh and London: Oliver and Boyd, 1965.) 70s.

EQUIMOMENTAL systems show that different line-density distributions may have the same mass, centroid (first moment) and moment of inertia (second moment). Stieltjes (1894) asked if a knowledge of all the higher-order moments would allow and imply a unique density; more precisely, given a sequence μ_k of numbers, can a non-decreasing function $\sigma(u)$ be found such that:

$$\int_0^\infty u^k \, d\sigma\,(u) = \mu_k. \quad (k=0,1,2,\ .\ .\ .)$$

The problem established the concept of the Stieltjes integral, and gave scope for Stieltjes's mastery of continued fractions. A little earlier, Tchebychev (1873) had discussed a similar problem: given the length, mass, centroid and second moment of a line segment, to find bounds for the mass of any sub-segment; more precisely and more generally, given:

$$\int_a^b u^k f(u)\, du, \quad (k=0,1,\ .\ .\ .\ .\ , n-1)$$

to determine bounds for:

$$\int_a^v f(u)\, du$$

for variable v in (a, b). Tchebychev's interest lay chiefly in the probability application.

Various extensions can be made: the interval may be replaced by a set of points, or extended to $(-\infty,\infty)$. Essentially, the main questions are: Does a solution exist; if so, how many significantly different solutions are there; and how can they be constructed?

The field remained relatively unexplored until just after the First World War, when in a burst of activity the first full discussion and solution were given by Hamburger, quickly followed by Nevanlinna, M. Riesz, Hellinger, and Carleman. The problem was seen to have connexions with many branches of analysis; thus Hausdorff, in two masterly papers, showed the relation with summation methods. Later, the development of functional analysis and linear operators provided new ways of looking at the problems, and new fields for applications and extensions. While many questions remain, so much has been done to codify the theory that the time is ripe for a broad survey. Prof. Akhiezer, who has himself contributed largely to recent progress in this domain, provided such a survey in his 1961 book, of which we now have a welcome translation in the new Oliver and Boyd "University Mathematical Monographs". After a necessary preliminary chapter on sequences and the related orthogonal polynomials and Jacobi matrices, he gives the main results of Hamburger, M. Riesz, and Nevanlinna, often using the present-day language of abstract spaces and functionals, and then deals with the moment problem as an instance of the spectral theory of operators; here the reader must know at least the elements of modern operator theory. The final chapter discusses a trigonometric moment problem, related to Carathéodory's problem about the conformal mapping of the unit circle on a half-plane when a correspondence between two point-sequences is prescribed; this leads on to certain continuous analogues of the moment problem.

The reader who is content to study the main text will obtain a sound and precise knowledge of the principal themes; but to master the subject he will be well advised to spend time and effort on the "addenda and problems" which complete each chapter, for these are not drill examples, but serious (and sometimes difficult) developments and extensions of the main text, relegated to a secondary position simply to reduce bulk. The young research student who appreciates abstract analysis while not despising manipulative skill should find here matter and questionings to his taste. T. A. A. BROADBENT

KANTIAN STUDIES

Experience and its Systematization

Studies in Kant. By Nathan Rotenstreich. Pp. vii+178. (The Hague: Martinus Nijhoff, 1965.) 21 guilders.

IN this work, the traditionally high standard of the house of Martinus Nijhoff is well maintained, and the author need have no reservations about the desirability of offering a selection of 'pivotal issues' which have become definitive for Kantian scholars. The master spent practically his whole life in his native city of Koenigsberg analysing empirical knowledge, and erecting on this ratiocination a systematic structure, which, at least in principle, involves ethics and aesthetics. It is a measure of the stature of this intellectual adventure that only comparatively recently has the suggestion been made that these axiological studies might eventually become subject to the power of symbolic logic. If ever they do, then Prof. Rotenstreich will have provided a suitable springboard for the transition, since the leap could scarcely be made from the *Critiques* in their original form, including, as they do, a number of inconsistencies and ambiguities.

For Kant, formal or general logic is almost a calculus for thought without regard to the differences which its objects present, whereas transcendental logic deals with origins—actually of our *a priori* knowledge of objects. This is the point of contact with the Husserl school, and the development of phenomenology, including the realization of empathy. If there is one word which expresses this connexion it is *Anschauung*, or intuition. Kant epistemologically allows time preference over space, although in terms of "true no matter what" they are supposedly equal. If, on the other hand, the criterion is ontological (following Parmenides and Spinoza), then the order is reversed. Twentieth-century physics was in fact to eliminate this distinction in the well-known relativistic prophecy of Minkowski. All of which goes to show the value of a re-assessment of Kant's technique.

In a discussion of the primacy of practical reason, it appears that immortality and God are not implied by